

APPENDIX A

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-498/88-46  
50-499/88-46

Operating License: NPF-76  
Construction Permit: CPPR-129

Dockets: 50-498  
50-499

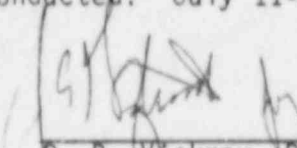
Licensee: Houston Lighting & Power Company (HL&P)  
P.O. Box 1700  
Houston, Texas 77001

Facility Name: South Texas Project (STP), Units 1 and 2

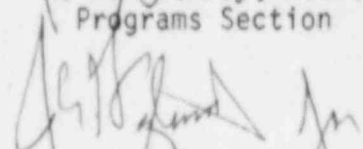
Inspection At: STP, Matagorda County, Texas

Inspection Conducted: July 11-15 and 25-29, and August 8-12, 1988

Inspectors:

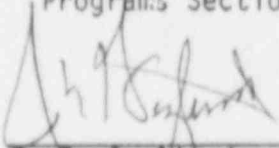
  
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R. B. Vickrey, Reactor Inspector, Operational  
Programs Section

9/1/88  
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Date

  
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R. Evans, Reactor Inspector, Operational  
Programs Section

9/1/88  
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Date

Approved:

  
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J. E. Gagliardo, Chief, Operational Programs  
Section

9/1/88  
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Date

Inspection Summary

Inspection Conducted July 11-15 and 25-29, and August 8-12, 1988  
(Report 50-498/88-46; 50-499/88-46)

Areas Inspected: Routine, unannounced inspection of operational safety verifications, electrical as-built, electrical components/systems work observation, and records review.

Results: Within the three areas inspected, one apparent violation was identified (paragraph 2).

DETAILS1. Persons ContactedHL&P

J. Bailey, Manager, Engineering and Licensing  
M. L. Duke, Staff Engineer  
J. E. Geiger, General Manager, Nuclear Assurance  
A. W. Harrison, Supervising Project Engineer  
S. M. Head, Supervising Project Engineer  
T. J. Jordan, Project Quality Assurance (QA) Manager (Unit 2)  
A. R. Mikus, General Superintendent, Construction  
D. Parker, Startup Engineer  
G. L. Parkey, Plant Superintendent, Unit 2  
M. F. Polishak, Lead Engineer, Project Compliance  
D. M. O'Gara, Project Compliance Engineer  
S. L. Rosen, General Manager, Operations Support  
J. A. Slabinski, Unit 2 Operations Quality Control (QC) Supervisor  
W. G. Westermeier, General Manager  
M. Wisenburg, Plant Superintendent, Unit 1

Bechtel Engineer Corporation (BEC)

L. W. Hurst, Assistant Project Manager  
K. P. McNeal, Project QA Engineer  
C. F. O'Neil, Unit 2 Engineering Manager

Ebasco Service, Inc.

R. A. Moore, Assistant QC Site Superintendent  
P. E. Phelan, QC Structural and HVAC Supervisor  
E. P. Rosol, Site Manager  
R. C. Sisson, Site Resident Engineer

All the above listed personnel attended the exit interview.

The NRC inspectors also contacted other licensee personnel including administrative, maintenance, operations, and QA personnel.

2. Operational Safety Verification (Unit 1) (71707)

The NRC inspectors made several tours through the plant observing work in progress on the diesel generator modifications. Several efforts were made to verify that fire door checks were being made at the appropriate intervals. During the course of these tours, one security door failed to close completely and it was noted that security responded to the area within a few seconds to take proper action.

The NRC inspectors spent several hours in the control room observing shift turnover, watchstander actions, and recording of logs. The NRC inspectors observed the shift briefing and operator control during a power increase from 90-98 percent power. The NRC inspectors were present in the control room to observe the 100 percent planned trip. Prior to the trip, a formal briefing was conducted for the watchstanders. Those in observation were properly informed of the events and where they could make their observations without interference with plant operations. The NRC inspectors observed the 100 percent trip, operator actions, and plant responses and found the test to be well planned and successfully conducted. Communications were well maintained and the operators acted in a very professional manner throughout the evolution.

During the observation of the weekly EICII battery surveillance, the NRC inspectors noted that 67 of 68 closure bolts were not installed in the hinged door of the battery room duct heater (Equipment No. 3V8IIVHX012). There were no maintenance activity tags in the vicinity to indicate work activity in the area. This observation was made on July 27, 1988, with the plant operating at 98 percent power. The missing bolts were about 1/2-inch in diameter. The door was 3 to 4-foot square and about 1-inch thick. The bolt that was installed in the door was not screwed into the threaded area of the support flange but was tight from the weight of the door resting on it. The installed bolt was on the side opposite the hinges in the lower corner with that edge of the door showing approximately 1/8-inch displacement in the downward direction from its apparent weight. The subject door was located approximately 5 feet directly over the battery cells. After the NRC inspectors brought this condition to the attention of licensee management on July 27, 1988, the licensee informed the NRC inspectors that no work was in process on the battery room duct heater. The licensee issued a station problem report (No. 880295) on July 27, 1988, to investigate the reason for removal of the heater bolts. Maintenance work request (MWR-65094) was initiated to replace the bolts. The duct heater door had apparently been in the unbolted condition since April 1988. The failure to secure the door with the bolts made the batteries very susceptible to significant damage in the event of a seismic event because the hinges may not be capable of supporting the massive door under seismic conditions.

The licensee identified, to the NRC inspectors, that the heater bolts had been removed by MWR HE-69441. The NRC inspectors obtained a copy of the completed MWR HE 69441 for review. The NRC inspectors review of the MWR found that:

- a. The description of the problem stated "Heaters will not maintain room temperature within limits of 72 to 82<sup>o</sup>F. Resetting breaker and heaters H/S does not help. Investigate and repair as needed."
- b. The MWR was originated and approved on April 2, 1988.
- c. Additional work instructions were issued on April 2, 1988, to adjust the automatic thermostat cutout and check the heater elements.

- d. The final two steps of the additional work instructions were:
- (1) "3.07 if defective elements are found, obtain data from part and return to supervisor or M/S to obtain part and write additional work instructions."
  - (2) "3.08 if no defective elements are found, ensure cover on heater cover box is installed, and restore system to normal."
- e. QC instructions stated, "Return MWR to OQC for planning if Step 3.07 (additional work instructions) is required."
- f. The work summary corrective action stated that "investigations showed that element No. 64 seemed to be shorted." The summary also stated, that, "Bolts from the heater door were put in the impound area of grid C-2-A."
- g. On April 3, 1988, additional work instructions were initiated and authorized on April 5, 1988, to replace heater element No. 64 and retest the heater banks.
- h. On May 23, 1988, the cognizant system engineer issued instructions to "Close out MWR-work not required heaters are working properly."
- i. On June 8, 1988, additional instructions were issued by the cognizant system engineer to "close out this MWR and write another MWR to repair/replace one heater element at a later date." At this time, the additional work instructions of April 3-5, 1988, were voided.
- j. The as-left conditions of the work summary were "one element shorted. The element is at T7 & T8. New MWR initiated. MWR 45065."
- k. On June 8, 1988, the maintenance section foreman signed off the maintenance work complete section of MWR HE-69441.
- l. The NRC inspectors found that an entry had been made on the licensee's computer system for MWR-HE-45065 on June 10, 1988. This provided a description title (in part) of "the element that is terminated at terminals T7 and T8 is shorted. Needs to be repaired or replaced . . . . (This problem was discovered while working MWR No. 69441)."
- m. On June 10, 1988, MWR HE-69441 was signed off by maintenance support section for document review.
- n. On June 13, 1988, the MWR HE-69441 was signed off by the responsible maintenance section authority for work package review.
- o. The NRC inspectors found that another entry had been made on the licensee's computer system for MWR HE-45065 on June 14, 1988, that the MWR was "cancelled per system engineer . . . heaters working properly."

- p. On June 20, 1988, the same cognizant system engineer signed off MWR HE-69441 for document review.
- q. On June 24, 1988, operations QA signed for document review.

Weekly battery surveillance tests provided five or six opportunities for the licensee to discover the missing bolts prior to the NRC discovery. Station Procedure OPGP03-ZM-0003, "Maintenance Work Request Program," Paragraph 4.13.9, requires that the maintenance support division "enter document numbers left open in Section X of MWR." This was done on June 10, 1988, when the new MWR 45065 was generated and on the computer system; however, since the MWR had not been approved by the (work start) approval authority, it was not a valid document in accordance with Paragraph 4.6.1.

The failure to have instructions or procedures to include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished as denoted in the above example is an apparent violation (498/8846-01).

Two weeks after the above discovery, the NRC inspectors toured the other battery rooms. During this tour, the NRC inspectors noted that a pull box cover located above battery E1A11 had only one screw holding the cover on. The utility identified the cause to be a failure to reinstall the screws after installation. The utility issued MWR XE-48664 to replace the missing screws.

### 3. Electrical As-Built Inspection (Unit 2) (37051)

An inspection of electrical cables, raceways, and conduit was performed to determine whether the as-built design documents correctly reflected the as-built condition of the STP, Unit 2 plant. A total of 18 cables, 36 terminations, 11 conduits, and 23 raceways were compared to design documents.

A representative sample of Class 1E electrical cables were selected for the inspection. The sample included power, control, and instrumentation cables. Specific as-built cable attributes inspected included: cable type, cable routing, cable identification, divisional separation, conductor colors, termination points, and heat shrink tubing (if used). A total of 18 cables and 36 terminations from 6 systems were inspected. Attachment A lists the cables and terminations inspected, the associated systems, and comments about the cables. The as-built documents used as references included: standard site procedures, cable termination cards, cable installation cards, elementary diagrams, and some vendor supplied wiring diagrams.

All cables inspected were compared to elementary diagrams. The elementary diagrams showed the associated cables, cable types, to and from locations, and conductor numbers. The elementary diagrams did not show wire colors or actual termination points. Some vendor drawings reviewed show the termination points. (Two vendor drawings were noted to differ slightly

from the as-built conditions.) The termination installation cards (referred to as EE580 cards) were as-built documents used to show cable numbers, conductor numbers, conductor colors, and termination block/point locations. During the inspection, two minor cable termination card errors were noted.

Standard Site Procedure SSP-26 (Revision 2), "Termination of Electrical Cable," requires cable markers on each end of a cable, but does not require each conductor to be labelled, unless the conductors are of the same color. The NRC inspectors noted all cables were correctly labelled, but the conductor labelling was inconsistent. Approximately 1/3 of all conductors inspected were individually labelled and two terminations had incorrect conductor labels.

Using cable installation cards, conduit layout plans, and cable tray plans, several cables were physically walked down to verify correct routing. Cable B2RC10C9PB was noted not to enter raceway B2XC4CTXAA, contrary to the routing suggested by the cable installation card. However, Standard Site Procedure SSP-27 (Revision 3), "Installation of Electrical Cable," allows a 3-foot variation in cable routing. Cable B2RC10C9PB met this criteria.

Eleven conduit and twenty-one raceway segments that carry Class 1E cables were inspected. The conduit and raceways were compared to layout plans and specifications. The following attributes were inspected: location and routing of conduit and raceways, divisional separation, conduit and raceway identification, and cable loading. Attachment B lists the conduit and raceway segments inspected.

It was noted that the conduit configurations do not conform exactly to the conduit layout plan drawings. The layout plans show the general path the conduit must take. However, the conduit is field routed in the areas shown on the layout plan drawings. Field routing allows the conduit path to vary from original design to avoid obstructions and to maintain physical separation criteria.

No violations or deviations were identified in the area of as-built electrical verification. However, several areas require further NRC review: conduit and raceway supports, the design change process and administrative controls. These areas will be reviewed during a future NRC inspection.

4. Electrical Components and Systems - Work Observations and Records (Unit 2) (51053 and 51055)

With safety-related electrical components and systems being 99 percent complete and no work available to be observed, the NRC inspectors observed QC performance of an area turnover for separation. This was conducted in the reactor containment building at elevation 37-3 and area 4B. During the course of this observation, the NRC inspectors located a cable in an adjacent area that was apparently exceeding its bend radius. This cable was identified to QC and subsequently written up on Nonconformance

Report SE-7618. The NRC inspectors considered this an isolated case as it appeared that the cable was probably originally installed with the proper bend radius.

Various pull cards and associated records used in the as-built verification were examined to determine proper documentation. Approximately ten cable receipt inspection records associated with items of Attachment A were also examined to determine proper documentation and traceability. The NRC inspectors toured various areas checking the status of electrical installations for abnormal conditions. During these tours, the NRC inspectors found an MWR tag No. 56930 on a battery room heater. When the utility was questioned about the work going on, it was discovered that the MWR had been voided without the tag being removed as it should have been per the maintenance work request program.

The NRC inspectors questioned QC about their requirements for free air cable support. After a discussion with several QC personnel, the utility agreed that SSP-27 (installation of electrical cable) was not clear on its definition. The utility subsequently issued a change ICN No. (AK)39 to SSP-27 to clarify free air cable support requirements in the procedure.

No violations or deviations were identified in the review of this program area.

5. Exit Interview (30703)

The NRC inspectors met with the licensee representatives denoted in paragraph 1 on July 29 and August 12, 1988, and summarized the scope and findings of the inspection. The licensee did not identify as proprietary any of the information provided to or reviewed by the NRC inspectors. An NRC resident inspector was present at both meetings.

ATTACHMENT A

CABLES INSPECTED

NOTE: Unless otherwise stated, both terminations of each cable were inspected.

<u>Cable</u>	<u>System</u>	<u>Comments</u>
C2AF05C3WC	Auxiliary Feedwater	Conductor U1 is not shown on vendor Drawing 8367-00163, at termination point TB25-2. Walkdown of cable routing to be performed later. Terminations verified correct.
D2AF09C1WD	Auxiliary Feedwater	Cable routing verified correct.
A2MB01C1SB	Main Control Boards	Only one termination verified. The second termination point was inside a control board plug.
A2NI01C1XU	Nuclear Instrumentation	Minor error noted on cable installation and termination cards: NSSS PROC CAB 01 is incorrectly described as NSSS PROC CAB 01A.
B2NI01C1XC	Nuclear Instrumentation	Minor error noted on cable installation and termination cards: NSSS PROCESS CAB PROT SET III incorrectly described as NSSS PROCESS CAB PROT SET II.
A2RCABCILA	Reactor Coolant	Cable routing verified correct. The colors of conductors in cable could not be verified as phases A, B, C. In the field, the leads are identified by a color. On electrical schematics, the leads are identified by A, B, or C. No correlation between conductor color and phase (A, B, C) could be identified.
A2RC05C1WG	Reactor Coolant	Walkdown of cable routing to be performed later. Terminations verified correct.
A2RC10CAXC	Reactor Coolant	One termination of cable A2RC10CAXB also verified correct. (cable A2RC10CAXB is spliced to cable A2RC10CAXC)



A2RC10C5PB	Reactor Coolant	Cable routing verified correct.
B2RC10C5PB	Reactor Coolant	Cable routing verified correct.
B2RC10C6PC	Reactor Coolant	One termination of cable B2RC10C6PB also verified correct. (cable B2RC10C6PB spliced to cable B2RC10C6PC)
B2RC10C9PB	Reactor Coolant	Cable routing verified correct. Cable does not enter raceway B2XC4CTXAA.
A2SI29C1PA	Safety Injection	Cable routing verified correct. One termination of cable A2SI29C1PE also verified correct (cable A2SI29C1PA is spliced to cable A2SI29C1PE). Two conductors (NC02, NC05) of cable A2SI29C1PA were mislabelled as WH01, WH02.
C2SIAGC1HB	Safety Injection	Cable routing verified correct.
C2SI12C3SB	Safety Injection	The conductors on one end of cable were labelled with wire numbers, but the other end was not.
A2SP16CGSE	Solid State Protection	Cable routing verified correct.
A2SP16JGSA1	Solid State Protection	This cable consisted of 14 jumper wires. Most conductors had incorrect wire numbers (missing number "0"). Cable routing correct per termination installation card (EE580 cards). Vendor drawing of wire terminations differs from EE580 cards (no change in logic).
A2SP27CASE	Solid State Protection	No comment.

ATTACHMENT B

RACEWAYS AND CONDUIT INSPECTED

NOTE: The raceways and conduit identified with a (\*) were inspected for cable loading.

<u>Raceways</u>	<u>Raceways</u>	<u>Conduit</u>
*A2XC3ATYAD	*B2XC4ATXAK	*A2XC3ARY014
A2XE2BTSVF	*B2XC4ATXAL	*A2XC3CRX107
A2XE2BTTAD	*B2XC4CTXAA	*A2XC3CRX122
A2XE2BTTAE	D2XE1GTSAA	A2XC3CRY678
A2XE2CTTAV	D2XE1GTSAB	*B2XC3ARX008
*B2XC4ATXAE	D2XE1GTSVA	*B2XC3CRX115
*B2XC4ATXAF	*D2XE2CTSAH	*B2XC3CRX145
*B2XC4ATXAG	*D2XE2CTSAL	B2XE3BRX026
*B2XC4ATXAH	D2XE2GTSAG	B2XE3BRX032
*B2XC4ATXAJ	*D2XE2GTSAK	D2XE1GRS064
	*D2XE2GTSBA	*D2XE2CRS003